

WHAT IS CLAIMED IS:

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1. A secondary-battery control circuit,
comprising:

a first path supplying a first load current
from one or more secondary batteries connected in series
10 or parallel, to a system, and including a first cutoff
switch; and

a second path supplying a second load current
from said one or more secondary batteries to the system,
wherein said first cutoff switch is turned off
15 if a voltage of said one or more secondary batteries is
lower than a first predetermined voltage, or if the
first load current is greater than a predetermined
current, thereby cutting off the first load current to
the system.

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2. The secondary-battery control circuit as
25 claimed in claim 1, wherein said second path includes a

second cutoff switch controlled independently of said first cutoff switch.

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3. The secondary-battery control circuit as claimed in claim 2, wherein said second cutoff switch is turned off if the voltage of said one or more secondary batteries is higher or lower than a second predetermined voltage.

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4. The secondary-battery control circuit as claimed in claim 2, further comprising:

a first standard-voltage generating circuit generating a first standard voltage;

20 a secondary-battery voltage detecting circuit detecting the voltage of said one or more secondary batteries;

a first comparing circuit comparing said first standard voltage with the voltage of said one or more 25 secondary batteries, to detect whether said one or more

secondary batteries are over-discharged;

a second standard-voltage generating circuit generating a second standard voltage;

5 a first voltage detecting circuit detecting a voltage corresponding to a current flowing through said one or more secondary batteries while said one or more secondary batteries are being discharged; and

10 a second comparing circuit comparing said second standard voltage with the voltage detected by said first voltage detecting circuit, to detect whether an excess current flows through said one or more secondary batteries,

15 wherein said first cutoff switch is controlled based on outputs of said first comparing circuit and said second comparing circuit.

20 5. The secondary-battery control circuit, as claimed in claim 4, further comprising:

a third standard-voltage generating circuit generating a third standard voltage;

25 a third comparing circuit comparing said third standard voltage with the voltage of said one or more

secondary batteries, to detect whether said one or more secondary batteries are overcharged;

a fourth standard-voltage generating circuit generating a fourth standard voltage;

5 a second voltage detecting circuit detecting a voltage corresponding to the current flowing through said one or more secondary batteries while said one or more secondary batteries are being charged; and

10 a fourth comparing circuit comparing said fourth standard voltage with the voltage detected by said second voltage detecting circuit, to detect whether the excess current flows through said one or more secondary batteries,

wherein said first cutoff switch is controlled
15 based on outputs of said third comparing circuit and said fourth comparing circuit.

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6. The secondary-battery control circuit as claimed in claim 1, wherein said system, to which the second load current is supplied through said second path, includes a remaining-charge indicating IC (Integrated Circuit) used for indicating a remaining charge of said
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one or more secondary batteries, or a resetting IC used for resetting the system.

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7. A battery pack, comprising:

one or more secondary batteries connected in series or parallel; and

10 a secondary-battery control circuit,
 wherein said secondary-battery control circuit includes a first path supplying a first load current from said one or more secondary batteries to a system, and including a first cutoff switch; and a second path
15 supplying a second load current from said one or more secondary batteries to the system, wherein said first cutoff switch is turned off if a voltage of said one or more secondary batteries is lower than a first predetermined voltage, or if the first load current is
20 greater than a predetermined current, thereby cutting off the first load current to the system.

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8. The battery pack as claimed in claim 7,
wherein said second path includes a second cutoff switch
controlled independently of said first cutoff switch.

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9. The battery pack as claimed in claim 8,
wherein said second cutoff switch is turned off if the
10 voltage of said one or more secondary batteries is
higher or lower than a second predetermined voltage.

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10. The battery pack as claimed in claim 8,
wherein said secondary-battery control circuit further
includes:

a first standard-voltage generating circuit
20 generating a first standard voltage;
a secondary-battery voltage detecting circuit
detecting the voltage of said one or more secondary
batteries;
a first comparing circuit comparing said first
25 standard voltage with the voltage of said one or more

secondary batteries, to detect whether said one or more secondary batteries are over-discharged;

a second standard-voltage generating circuit generating a second standard voltage;

5 a first voltage detecting circuit detecting a voltage corresponding to a current flowing through said one or more secondary batteries while said one or more secondary batteries are being discharged; and

10 a second comparing circuit comparing said second standard voltage with the voltage detected by said first voltage detecting circuit, to detect whether an excess current flows through said one or more secondary batteries,

wherein said first cutoff switch is controlled
15 based on outputs of said first comparing circuit and said second comparing circuit.

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11. The battery pack, as claimed in claim 10,
wherein said secondary-battery control circuit further includes:

a third standard-voltage generating circuit
25 generating a third standard voltage;

a third comparing circuit comparing said third standard voltage with the voltage of said one or more secondary batteries, to detect whether said one or more secondary batteries are overcharged;

5 a fourth standard-voltage generating circuit generating a fourth standard voltage;

 a second voltage detecting circuit detecting a voltage corresponding to the current flowing through said one or more secondary batteries while said one or
10 more secondary batteries are being charged; and

 a fourth comparing circuit comparing said fourth standard voltage with the voltage detected by said second voltage detecting circuit, to detect whether the excess current flows through said one or more
15 secondary batteries,

 wherein said first cutoff switch is controlled based on outputs of said third comparing circuit and said fourth comparing circuit.

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12. The secondary-battery control circuit as claimed in claim 7, wherein said system, to which the
25 second load current is supplied through said second path,

includes a remaining-charge indicating IC (Integrated Circuit) used for indicating a remaining charge of said one or more secondary batteries, or a resetting IC used for resetting the system.

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13. A portable device comprising:

- 10 a battery pack that includes one or more secondary battery connected in series or parallel, and a secondary-battery control circuit; and
 a load circuit supplied with a load current from said battery pack,
- 15 wherein said secondary-battery control circuit includes a first path supplying a first load current from one or more secondary batteries connected in series or parallel to a system, and including a first cutoff switch; and a second path supplying a second load current from said one or more secondary batteries to the system, wherein said first cutoff switch is turned off if a voltage of said one or more secondary batteries is lower than a first predetermined voltage, or if the first load current is greater than a predetermined current, thereby cutting off the first load current to
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the system.

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14. The portable device as claimed in claim
13, wherein said second path includes a second cutoff
switch controlled independently of said first cutoff
switch.

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15. The portable device as claimed in claim
15 14, wherein said second cutoff switch is turned off if
the voltage of said one or more secondary batteries is
higher or lower than a second predetermined voltage.

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16. The portable device as claimed in claim
14, wherein said secondary-battery control circuit
further includes:
25 a first standard-voltage generating circuit

generating a first standard voltage;

a secondary-battery voltage detecting circuit
detecting the voltage of said one or more secondary
batteries;

5 a first comparing circuit comparing said first
standard voltage with the voltage of said one or more
secondary batteries, to detect whether said one or more
secondary batteries are over-discharged;

10 a second standard-voltage generating circuit
generating a second standard voltage;

a first voltage detecting circuit detecting a
voltage corresponding to a current flowing through said
one or more secondary batteries while said one or more
secondary batteries are being discharged; and

15 a second comparing circuit comparing said
second standard voltage with the voltage detected by
said first voltage detecting circuit, to detect whether
an excess current flows through said one or more
secondary batteries,

20 wherein said first cutoff switch is controlled
based on outputs of said first comparing circuit and
said second comparing circuit.

17. The portable device, as claimed in claim
16, wherein said secondary-battery control circuit
further includes:

- a third standard-voltage generating circuit
5 generating a third standard voltage;
- a third comparing circuit comparing said third
standard voltage with the voltage of said one or more
secondary batteries, to detect whether said one or more
secondary batteries are overcharged;
- 10 a fourth standard-voltage generating circuit
generating a fourth standard voltage;
- a second voltage detecting circuit detecting a
voltage corresponding to the current flowing through
said one or more secondary batteries while said one or
15 more secondary batteries are being charged; and
- a fourth comparing circuit comparing said
fourth standard voltage with the voltage detected by
said second voltage detecting circuit, to detect whether
the excess current flows through said one or more
secondary batteries,
- 20 wherein said first cutoff switch is controlled
wherein said first cutoff switch is controlled
based on outputs of said third comparing circuit and
said fourth comparing circuit.

18. The portable device as claimed in claim
13, wherein said system, to which the second load
current is supplied through said second path, includes a
remaining-charge indicating IC (Integrated Circuit) used
5 for indicating a remaining charge of said one or more
secondary batteries, or a resetting IC used for
resetting the system.